Water heaters for use with Natural and L.P.G.

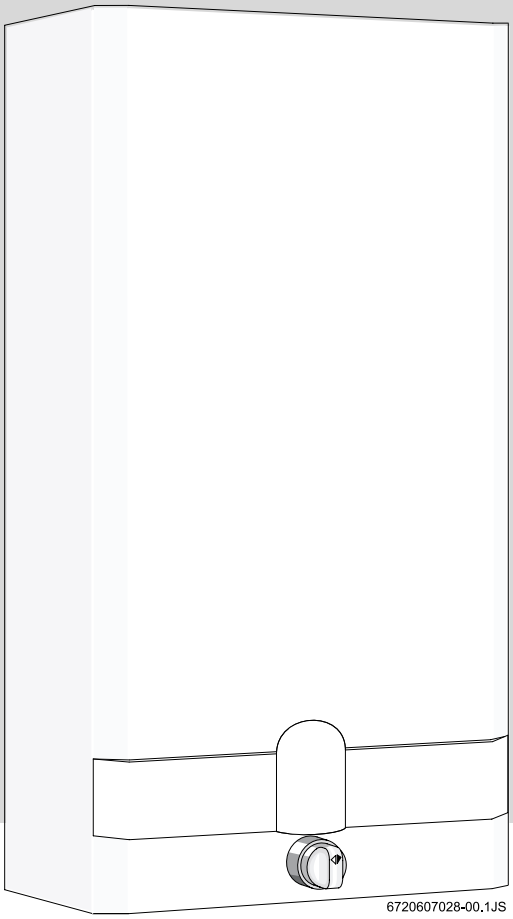
GWH 425 HN

Flow Modulated with Electronic Ignition

Suitable for heating potable water only - Not approved for space heating purposes

(Intended for variable flow applications with steady cold water inlet temperatures)

PRO TANKLESS™ by BOSCH



PHCC PLUMBING-HEATING-COOLING CONTRACTORS ASSOCIATION

GWH-425-HN-N
GWH-425-HN-L

Warning: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or death. Do not store or use gasoline or other flammable vapor and liquids in the vicinity of this or any other appliance.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the gas supplier.
In the Commonwealth of Massachusetts this product must be installed by a licensed plumber or gas fitter.

Upon completion of the installation, these instructions should be handed to the user of the appliance for future reference.

What to do if you smell gas

- Close gas valve. Open windows.
- Do not try to light any appliance
- Do not touch any electrical switch; do not use any phone in your building
- If you cannot reach your gas supplier, call the fire department.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

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FOR YOUR SAFETY

Do not store or use gasoline or other flammable, combustible or corrosive vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

- **Do not try to light any appliance.**
- **Do not touch any electrical switch; do not use any phone in your building.**
- **Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.**
- **If you cannot reach your gas supplier, call the fire department.**
- **Installation and service must be performed by a qualified installer, service agency or the gas supplier.**

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Principle of Operation:
When a hot water faucet is opened, the water flow through the heater causes the gas valve to open. At the same time the hydro-generator activates the electronics which sends a spark to the pilot. The flame sensor confirms the pilot has been lighted and allows the first two burners to come on. The flame sensor confirms correct activation and all burners come on. The pilot goes off. The heat exchanger coils absorb the heat generated by the burners and transfer heat to the water. When the hot water faucet is shut off, the gas valve automatically closes and the burners turn off. Your hot water faucet is an ignition key to activate the water heater, giving you control over your hot water energy use. Every time you turn off your hot water faucet, the energy consumption of your hot water returns to zero.

FEATURES

- Electronic Pilot Ignition driven by hydro-generator
- High Quality Materials for Long Working Life.
- Copper heating coils for endless supply of hot water.
- Burner output proportional to hot water flow demand for maximum energy efficiency.
- Safety flame sensor at pilot burner.
- Automatic overheating protection shut-off sensor.
- Flue gas safety device.
- Stainless steel burners with stabilized blue flame.
- Built-in corrosion resistant draft diverter.
- Compact space saver: mounts on a wall with two hooks.
- Easily removable one-piece cover.
- Easy one person installation.
- Adjustable water flow restrictor to ensure that water flow demand will not exceed the heating capacity of the heater.
- On/Off Switch to activate system.
- Red LED indicator flashes with low water pressure.
- Green LED indicator main burner operation.

BOSCH is constantly improving our products, therefore specifications are subject to change without prior notice.

425 HN LP and 425 HN NG Specifications

Gas Input max.: 117,000 Btu/hr
min.: 28,000 Btu/hr

Water Connection ½" Thread fitting NPT

H x W x D 29 3/4" x 18 1/4" x 8 3/4"

Vent 5"

Gas Connection 1/2" NPT thread

Min. Water Pressure 18 Psi at 4 GPM

Max. Water Pressure 150 Psi

Shipping Weight 43 LB

Net Weight 40 LB

1.8 GPM at 90° rise

3.7 GPM at 45° rise

Min. Water Flow 1/2 gal/min

LP GAS Supply Pressure (before 425 HN regulator) min. 11" W.C.
max. 14" W.C.*

Required LP GAS Pressure at inlet tap while 425 HN is operating: 10.5" W.C.

LP GAS Burner Manifold pressure while 425 HN is operating at maximum input: 9.0" W.C.

Natural Gas Supply Pressure (before 425 HN regulator) min.: 7" W.C.
max.: 14" W.C.*

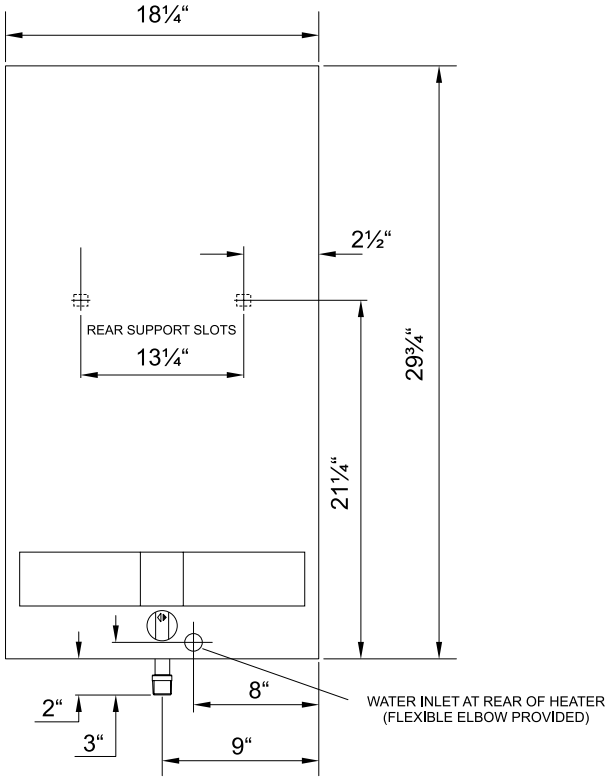
Required Natural Gas Pressure at inlet tap while 425 HN is operating: 5.7" W.C.

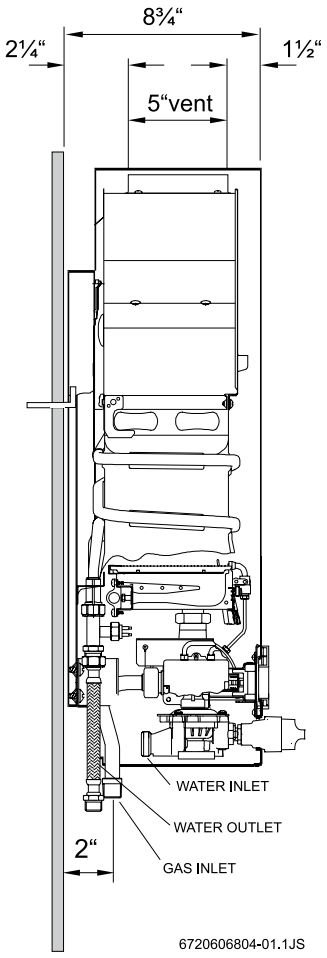
Natural Gas Burner Manifold Pressure while 425 HN is operating at maximum input: 4.2" W.C.

* Inlet gas pressure before 425 HN regulator must not exceed this value. Pressure may need to be adjusted for high altitudes, see page 7.

UNPACKING THE 425 HN HEATER

This heater is packed securely. The box includes one water connection fitting, a control knob with collar, a gas pressure regulator, a pressure relief valve, an incandescent particle tray, two hooks for hanging the heater, this manual and a warranty registration card. **Do not lose this manual, as there is a charge for replacement.** Please complete and return the enclosed warranty registration card.

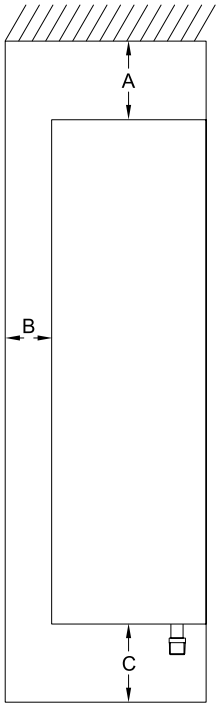




FRONT VIEW

SIDE VIEW

MINIMUM INSTALLATION CLEARANCES FROM COMBUSTIBLE AND NON COMBUSTIBLE MATERIALS FOR ALCOVE OR CLOSET INSTALLATIONS



	MODEL 425 HN
TOP (A)	12"
FRONT (B)	4"
BACK	0"
SIDES	4"
FLOOR (C)	12"
VENT DIAMETER	5"

MODEL 425HN

GENERAL RULES TO FOLLOW FOR SAFE OPERATION

1. You should follow these instructions when you install your heater. In the United States: The installation must conform with local codes or, in the absence of local codes, the National Fuel Gas Code ANSI Z223.1/NFPA 54.
In Canada: The Installation should conform with CGA B149.(1,2) INSTALLATION CODES and /or local installation codes.

2. Carefully plan where you install the heater. Correct combustion air supply and flue pipe installation are very important. If not installed correctly, fatal accidents can be caused by lack of air, carbon monoxide poisoning or fire.

3. The place where you install the heater must have enough ventilation. The National Fire Codes do not allow gas fired water heater installation in bathrooms, bedrooms or any occupied rooms normally kept closed. See the section below on locating the heater.

4. You must vent your heater. See section on VENTING, Page 6.

5. The appliance must be disconnected from the gas supply piping system during any pressure testing at pressures in excess of 1/2 Psig (3.5 kPa).
The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or more than 1/2 Psig (3.5Kpa). The appliance and its gas connection must be leak tested before placing the appliance in operation.

6. Keep water heater area clear and free from combustibles and flammable liquids. Do not locate the heater over any material which might burn.

7. Correct gas pressure is critical for the optimum operation of this heater (see specifications on page 2). Gas piping must be sized to provide the required pressure at the maximum output of the heater, while all the other gas appliances are in operation. Check with your local gas supplier, and see the section on connecting the gas supply.

8. Should overheating occur or the gas supply fail to shut off, turn off the gas supply at the manual gas shut off valve on the gas line.

9. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

PROPER LOCATION FOR INSTALLING YOUR HEATER

Carefully select the location of your new heater. For your safety and for proper heater operation, you must provide an abundant supply of combustion air and a proper venting.

The heater may still operate even when improperly vented. It will, however, be less efficient and could eventually damage the heater. It could even result in human sickness or death due to oxygen deprivation and carbon monoxide poisoning. Follow the guidelines below:

1. Place your heater as close to a vent or chimney as possible.

2. National building codes require that you do not install this appliance in bathrooms, bedrooms or any occupied rooms normally kept closed.

3. Simultaneous operation of other appliances such as exhaust fans, ventilation systems clothes dryers, fireplaces or wood stoves could create a vacuum effect in your home which could cause dangerous combustion by-products to spill back into your home rather than venting to the outside through the flue. Confirm that your 425 HN is venting properly when all these other appliances are running. See section on venting.

Do not obstruct the flow of combustion and ventilation air to the appliance. If installed near a clothes dryer it is very important that the dryer be properly vented. Failure to properly vent a dryer could result in a gradual accumulation of lint on the water heater fin coils and burners, leading to a dangerous condition of vent blockage and poor unsafe combustion.

4. Your hot water lines should be kept short to save energy. It is always best to have hot water lines insulated.

5. This product is neither designed nor approved for outside installations. This product is not approved for manufactured homes (mobile home), recreational vehicles (RV) or boats. Reference ANSI Z21.10.3.

⚠ **WARNING:** The water in this water heater is cold and always remains cold except for the times that hot water is being used **DO NOT INSTALL IN AN AREA WHERE IT COULD FREEZE.**
This heater is neither designed for nor approved for outside installation.
Drain the heater entirely if freezing temperatures are anticipated in area where heater is installed by disconnecting both the inlet and outlet water connections from the heater (disconnect the outlet flex line from where it connects to the copper heat exchanger). Additionally remove the drain plug under the water valve. See Fig. 1.

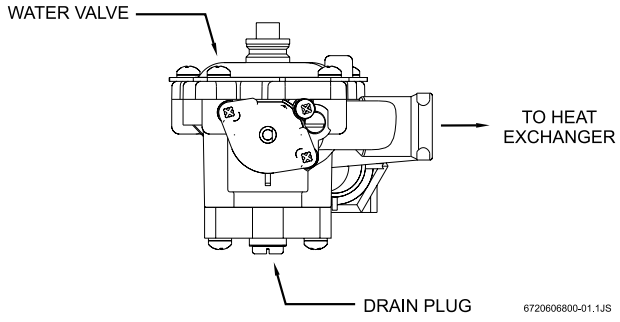


Fig. 1 - Water heater drain plug

⚠ **WARNING: Flammable materials, gasoline, pressurized containers, or any other items or articles that are potentially fire hazards must NOT be placed on or adjacent to the heater. The appliance area must be kept free of all combustible materials, gasoline and other flammable vapors and liquids.**

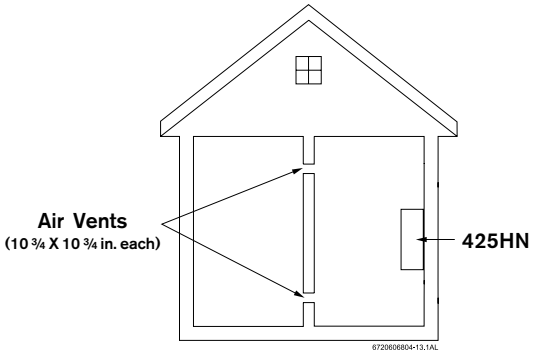
COMBUSTION AIR REQUIREMENTS

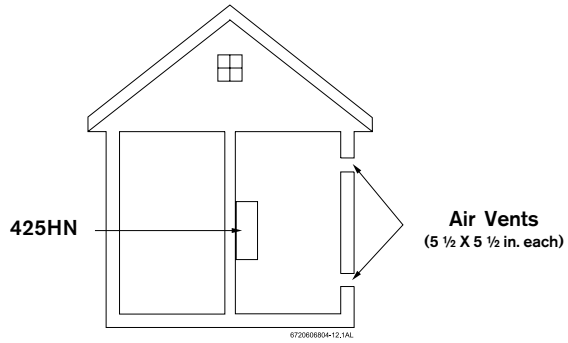
The 425 HN water heater holds cold water in its copper heat exchanger and brass water valve when not in use. Because of this, any cold air that comes down through the unit's vent pipe is capable of freezing these components. This Installation Manual specifies the minimum vertical vent pipe and the amount of combustion air required for this unit. When all requirements are followed, the unit will operate properly and safely. However, there may still be a risk of freezing due to negative draft if all the combustion appliances in the area are not being supplied with a sufficient amount of make-up air. A wood stove or furnace may pull combustible air down through the 425 HN vent system, leaving the cold infiltrating air capable of freezing the cold water in the 425 HN heat exchanger. More make up air is the solution. Follow the instructions on venting and checking adequacy of make up air. A HVAC specialist should be used to design solutions for providing more make-up air if necessary.
Observe the following instructions concerning combustion air.

Appliances located in unconfined spaces:

a) An unconfined space is one whose volume is greater than 50 cubic feet per 1000 Btu per hour of the combined rating of all appliances installed in the space. That would be 5850 cubic feet for the 425HN alone.

b) In unconfined spaces in buildings of conventional frame, masonry, or metal construction, infiltration is normally adequate to provide air for combustion, ventilation, and dilution of flue gasses.





Appliances located in confined spaces:
The confined space must be provided with two permanent openings, one commencing within 12 inches of the top and one commencing within 12 inches of the bottom of the enclosure. Each opening must have a minimum free area of one square inch per:
- 1000 Btu/hr if all air is taken from inside the building.
- 2000 Btu/hr if all air is taken from the outside by horizontal ducts.
- 4000 Btu/hr if all air is taken from the outside by direct openings or vertical ducts.

Or the confined space must be provided with one permanent opening or duct that is within 12 inches of the ceiling of the enclosure. This opening must have a minimum free area of one square inch per:
- 3000 Btu/hr if all air is taken from the outside by a direct opening or vertical duct.

Louvers, grills and screens have a blocking effect. If the effective free area is not known, increase the sizes of your openings by 75% if your louvers are wood and by 30% if your louvers are metal. Refer to the National Fuel Gas Code for complete information. In buildings of tight construction all air should be taken from outside.

CLEARANCES

The 425 HN is design certified for installation on a combustible wall and for installation in an alcove or closet with the minimum clearances to combustible and non - combustible construction listed below

A. Top 12 inches (306 mm)
B. Front 4 inches (102 mm)
C. Back 0 inches
D. Sides 4 inches (102mm)
E. Bottom 12 inches (306 mm)

Clearance from vent is dependent upon the clearance rating of the venting material used. For example: type B-1 vent is approved for 1 inch clearance.

Note: Typically, the minimum clearence to combustible materials should not be less than 6“ for single wall flue pipe. Note that this clearance can be reduced if combustible materials are protected as per table VI of the National Fuel Gas Code or if Type B gas vent is used.

MOUNTING INSTALLATION

The 425HN is design certified for mounting on a wall.
Secure the two L shaped hooks, which are provided with heater, to a wall surface. Place them 13 ¼" apart as shown in Fig. 2.
Do not install this appliance on a carpeted wall or over floor covering which is combustible, such as carpet. The heater must be mounted on a wall using appropriate anchoring materials. If wall is a stud wall sheathed with plasterboard, **it is recommended that support board(s), either 1x4's or 1/2" (minimum) plywood first be attached across a pair of studs and then the heater should be attached to the support boards. See Fig. 2.**
Expansion and contraction of piping due to changing water temperature in the pipes imparts movement to the heater which, if mounted directly to a brittle, friable board, such as

plasterboard, can cause failure of mounting.
In earthquake-prone zones, CEC recommends that installers use a large washer and lag screw through the existing holes used to hang the heater to affix the upper third of the heater to the mounting board. To affix the lower third of the heater, CEC recommends that two new holes be drilled in the heater's frame, each one 16 inches below the top two holes, and that washers and lag screws be used to secure the lower portion of the heater to a spacing board.
Before installing the unit, be certain you have the correct heater for your type of Gas – Propane or Natural Gas. Identification labels are found on the shipping box, and on the rating plate which is located on the right side panel of the cover. Also, each burner orifice is stamped with a number (79 for LPG and 120 for Natural Gas).

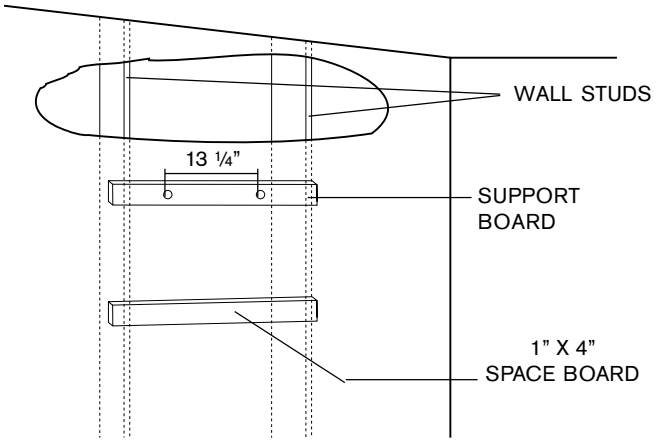


Fig. 2 - Mounting the Heater

The incandescent particle tray (shipped loose in the carton with the water heater) must be attached at the bottom of the water heater front cover at the time of installation. Use the screws provided. See figure 3

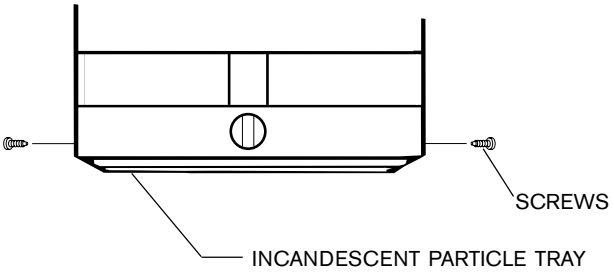


Fig. 3 - Incandescent Particle Tray Illustration

VENTING

Vent pipe connection.

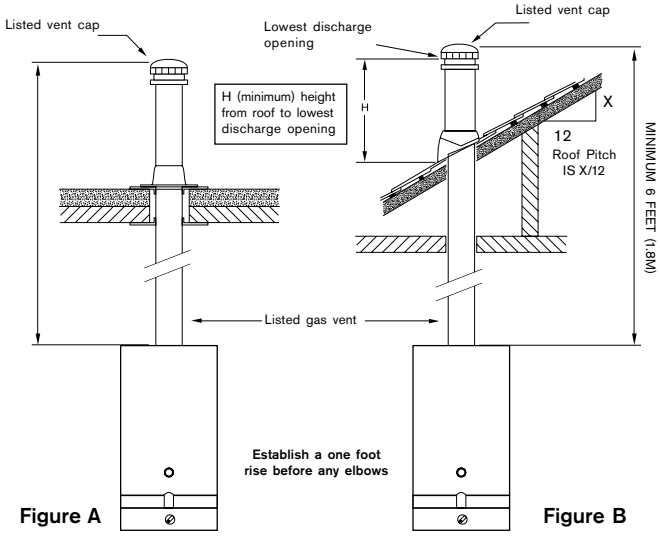
WARNING: Do not reduce the vent pipe size. See Fig. 4 for high altitude installations

The heater must be vented to the outside following all local ordinances and specifications for installing a gas appliance vent or chimney. The heater must be located as close as practicable to a vertically rising chimney or vent that has a listed vent cap at its termination point. The venting system must be designed and constructed so as to develop a positive flow adequate to remove flue gasses to the outdoors.
Consult the National Fuel Gas Code if the vent will have elbows or share venting with another natural draft appliance. The heater should never be common vented with a mechanically vented appliance. Single wall vent pipe is not recommended, if used consult the National Fuel Gas Code.

Horizontally venting to a sidewall vent terminator or a vertically constructed vent stack along an outside wall of a building is not permissible. A Powervent (Model AQ-1), with a proof-of-draft safety interlock device, is required and is available in order to sidewall vent. Contact your dealer. **In the Commonwealth of Massachusetts: Powervented applications must utilize proof-of-draft safety interlock device.**

VERTICAL GAS VENT: A 5 inch diameter gas vent constructed of double wall Type B gas vent is recommended. 6 inch is required in elevations greater than 2000 feet, see Fig. 4. Any gas vent section that is greater than 45 degrees from the vertical is considered horizontal. Horizontal sections must slope upwards at least ¼ inch for every foot of its horizontal length and be properly supported. Keep the horizontal section short and avoid too many elbows. The minimum vertical gas vent height allowed is 6 feet; horizontal vent connectors and elbows are not to be considered in the total gas vent height. All gas vent sections must be secured to each other with sheet metal screws and be properly supported.

The gas vent constructed of double wall Type B gas vent must terminate above the roof surface with a listed vent cap at a height that's in accordance with Figure A or B and their table, provided they are at least 8 feet (2.4 m) from a vertical wall or similar obstruction. All other gas vents that are not able to terminate within the minimum specified height allowed must terminate not less than 2 feet (0.6 m) above the highest point where it's passed through the roof and at least 2 feet (0.6 m) higher than any vertical wall or similar obstruction within 10 feet (3.1 m).



GAS VENT TERMINATIONS FOR LISTED VENT CAPS		
Roof pitch	H (minimum) feet	meters
Flat to 6/12	1.0	0.30
6/12 to 7/12	1.25	0.38
Over 7/12 to 8/12	1.5	0.46
Over 8/12 to 9/12	2.0	0.61
Over 9/12 to 10/12	2.5	0.76
Over 10/12 to 11/12	3.25	0.99
Over 11/12 to 12/12	4.0	1.22
Over 12/12 to 14/12	5.0	1.52
Over 14/12 to 16/12	6.0	1.83
Over 16/12 to 18/12	7.0	2.13
Over 18/12 to 20/12	7.5	2.27
Over 20/12 to 21/12	8.0	2.44

MASONRY CHIMNEY: Masonry chimneys shall be built and installed in accordance with NFPS 211 or local codes. A minimum 5" diameter gas vent pipe (metal double wall Type B), or an approved clay flue liner or a listed chimney lining system must be used when venting into a naturally drafting, internal masonry chimney. 6 inch is required in elevations greater than 2000 feet, see Fig. 4. Local codes may require the use of both gas vent *and* an approved lining system when venting into a masonry chimney. The Commonwealth of Massachusetts requires the use of a listed liner. Lining systems include approved clay flue lining, a listed chimney lining system or other approved material that will resist corrosion, erosion, softening, or cracking from exhaust flue gases at temperatures up to 1800 degrees F. The lining system must be listed for use with naturally drafting, draft hood equipped gas appliances. Follow local codes and refer to NFGC 54 and NFPA 58.

When connecting the water heater to a masonry chimney the following connector guidelines must be followed for safe and proper operation: An approved gas vent connector must be attached to the top of the water heater and rise vertically at least 12" before entering into an approved gas vent connector elbow. Any gas vent section that is greater than 45 degrees from the vertical is considered horizontal. If a horizontal vent connector is to be used to connect the vertical gas vent connector on the top of the water heater to the masonry chimney, that approved horizontal gas vent connector must be kept as short as possible and must be sloped upwards at least ¼" per foot of its length. This connector must be supported throughout its horizontal length. This horizontal gas vent connection may be no greater than 75% of the total vertical gas flue vent within the chimney. Also, an approved thimble or collar must be used when penetrating a masonry chimney.

A) Existing INTERIOR Masonry Chimney

The metal gas vent pipe should be permanently mounted inside the masonry chimney. Double wall Type B gas vent is recommended. The masonry chimney may have to be tile or metal lined before the insertion of the gas vent pipe; check local codes for clarification. The lining material must be listed for use only with naturally drafting, draft hood equipped gas appliances. Follow manufactures instructions for installation of listed lining material. You may not vent any other fuel burning appliances into any free space remaining in the chimney. The minimum vertical gas vent length within the masonry chimney should be no less than 5 ft (1.5 m); the vent terminator should extend at least 3 feet (0.9 m) above where the chimney meets the roofline and at least 2 feet (0.6 m) higher than any vertical wall or similar obstruction within 10 feet (3.1 m). The top of the gas vent should have an approved vent terminator. See Figure C.

B) Tile Lined INTERIOR Masonry Chimney

The masonry chimney must have an approved liner, ceramic tile, clay or metal. The masonry chimney must be able to accommodate the spent fuel gasses; consult a venting HVAC contractor for chimney capacity. A common venting like-fuel appliance into this lined masonry chimney is permissible. The chimney's diameter must be large enough to adequately draft the spent fuel gasses. A venting HVAC contractor will be required to spec a chimney system. The minimum vertical chimney length should be no less than 5 ft (1.5 m); the termination point should extend at least 3 feet (0.9 m) above where the chimney meets the roofline and at least 2 feet (0.6 m) higher than any vertical wall or similar obstruction within 10 feet (3.1 m). See Figure C.

C) EXTERIOR masonry Chimney

Refer to the National Fuel Gas Code and consult a local venting HVAC contractor.

MASONRY CHIMNEYS

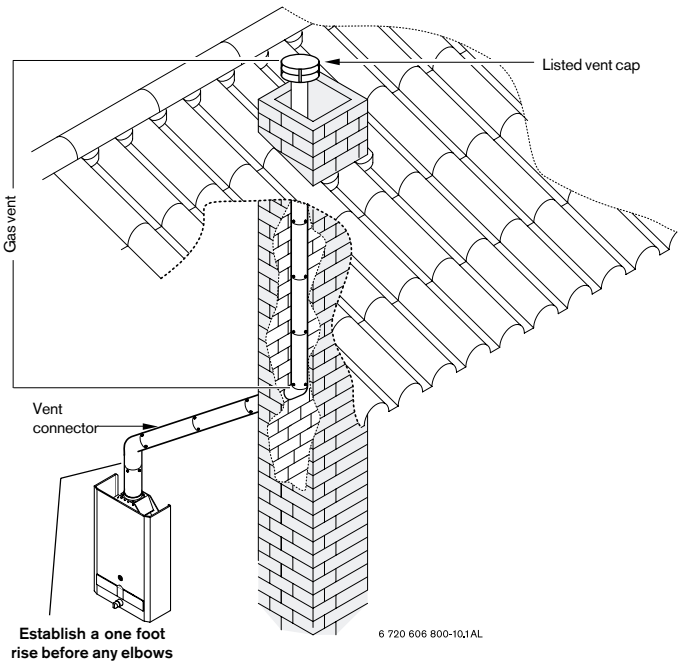


Figure C

To check the draft:

Close all doors and windows to the outside.

Turn on all appliances that force air out of the building. These include all exhaust/ventilation fans, furnaces, clothes dryers, wood burning stoves, etc.

Open all doors between the 425 HN and these other appliances.

With the control knob set fully clockwise and strong hot water flow rate, run the unit for at least 10 minutes. The 425 HN is equipped with a Flue Gas Sensor; it's mounted on the right side of the draft diverter (Flue Gas Sensor #34 on page 17). If the main burners shut off during this test it is because the Flue Gas Sensor has detected inadequate venting. This is a serious health hazard and must be corrected. Poor venting can result in soot building up inside the heater, overheating of the heater and freezing of the heat exchanger in a freezing environment, which is all a result of negative air flow. Additional combustion air and/or improved venting will be necessary to correct this.

⚠ WARNING

Note: The burners of an instantaneous "on demand" water heater such as the 425 HN are only on at the time that hot water is actually being used, the vent pipe is therefore cold except for the short durations when hot water is being used, it is therefore very important that the venting and air supply be adequate to provide a good positive draft as soon as the burners turn on.

The 425 HN instantaneous water heaters have built-in draft diverters and are designed for indoor installation only. The

draft diverter outlet must be connected to an unobstructed vent of the same size, or larger.

In Canada, CAN/CGA-B149 Installation Code for detailed requirements

In U.S.A., ANSI Z223.1 - NFPA 54, National Fuel Gas Code for detailed requirements.

The vent connection for the 425 HN is 5 inches. However, for installations at high altitude (over 2000 feet above sea level) a six inch vent is required. A 5" by 6" vent adaptor must be affixed to the flue collar of the 425 HN with at least two screws. See fig. 4.

⚠ **WARNING**: Failure TO INCREASE THE VENT SIZE TO SIX INCHES AND/or assure that the manifold pressure is set to proper value listed for applications at high altitudes will cause unsafe venting, asphyxiation, and will void CSA Certification.

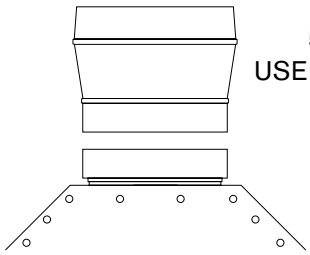


Fig. 4 - Vent Adaptor for High Altitude Installations

GAS CONNECTIONS

NOTE: The 425 HN is supplied with a gas pressure regulator that must be installed on the heater before attaching the gas supply line. See fig. 5. Failure to install the gas regulator as shown in figure 5 will be a violation of CSA certification of the unit. The regulator supplied with the heater is preset for the gas shown on the rating plate to the correct pressure. It is an appliance level regulator designed for (low inlet) pressure (less than 1/2 Psig or 15" W.C.)

DO NOT connect to an unregulated or high pressure propane line or to a high pressure commercial natural gas line.

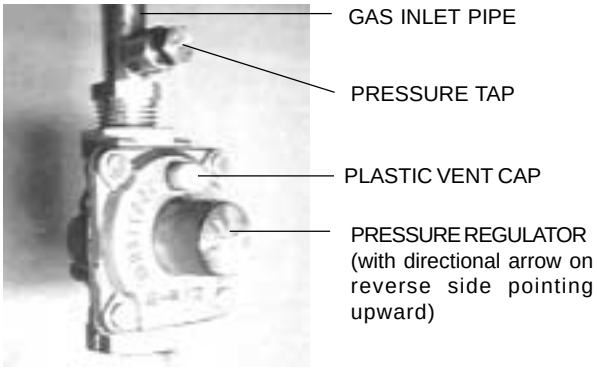


Fig. 5 - Installation of Gas Pressure Regulator

The pressure regulator provided with the heater is adjusted to deliver the proper gas pressure (as indicated on the rating plate and in the manual for altitude up to 2000 feet (660 meters) above sea level. On appliances being installed above 2000 ft (660 meters) elevation, the inlet gas pressure should be set at installation to the value shown below.

NOTE: The gas pressures specified below refer to pressures taken at the pressure tap on the gas inlet pipe just above the regulator (See Fig 5). These readings should be taken while the heater is operating at full input — i.e. maximum water flow with the temperature dial selector turned all the way clockwise.

MAXIMUM INLET GAS FLOW PRESSURE SETTING

Altitude	Natural Gas inches W.C:	Liquid Propane inches W.C:
0' - 2.000 ft	5.7"	10.5"
2.000 ft - 4.500 ft	4.6"	8.4"

Above 4.500 ft consult your local gas provider.

GAS LINE SIZING

-It is strongly recommended that the Natural Gas pipe be Black Iron pipe the entire distance from the outside meter to the inlet of the 425 HN regulator. 1/2" Black Iron pipe up to 10 feet, 3/4" Black Iron pipe up to 40 feet and 1" Black Iron pipe up to 150 feet distances. Flex line tubing is NOT recommended, but if used then oversize it.

-It is strongly recommended that the LP Gas pipe be semi-rigid copper or Black Iron pipe from the outside regulator to the inlet of the 425 HN regulator. For semi-rigid copper piping: 5/8" up to 20 feet and 3/4" up to 60 feet distances. For Black Iron piping: 1/2" up to 45 feet and 3/4" up to 160 feet distances. Flex line tubing is NOT recommended, but if used then oversize it.

THESE FIGURES ARE FOR 425 HN SUPPLY ONLY, ALL OTHER APPLIANCES IN THE BUILDING WILL NEED TO BE INCLUDED IN THE PIPE SIZING.

National Fuel Gas Code requires that a sediment trap (drip leg) be installed on gas appliances not so equipped. The drip leg must be accessible and not subject to freezing conditions. Install in accordance with the recommendations of the serving gas supplier.

⚠ **WARNING:** The heater must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 0.5 psig.

The water heater must be isolated from the gas supply piping system by closing the manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or more than 0.5 psig.

The water heater, including the pressure regulator provided with it, must not be operated at gas supply pressures in excess of 0.5 psig. If overpressure has occurred, such as through improper testing of the gas lines or malfunction of the supply system, the gas valve and regulator must be checked for safe operation. Make sure that the regulator vent is protected against blockage.

When your connections are made, check for gas leaks at all joints (not just the ones you made). Apply some soapy water to all gas fittings and gas valve. **Soap bubbles are a sign of a leak.**

NOTE: Do not apply soap solution to the pilot or pilot orifice area. If you have a leak, shut off the gas. After verifying that required gaskets are in place, tighten appropriate fittings to stop leak. Turn the gas on and check again with a soapy solution. **Never test for gas leaks using a match or flame**.

GAS PIPING, CONNECTIONS and Gas Regulator

Before connecting the gas supply, check the rating plate on the right side of the front cover to be sure that the heater is rated for the same gas to which it will be connected.
In the United States: The installation must conform with local codes or, in the absence of local codes, the National Fuel Gas Code ANSI Z223.1/NFPA 54.
In Canada: The Installation should conform with CGA B149 INSTALLATION CODES and /or local installation codes.

GAS LINE SIZING

The gas supply piping should be sized according to the Applicable Plumbing Code for a maximum draw of 117,000 BTUH. First determine the effective length of the gas supply line by measuring the actual length of piping, and then adding 5 ft. for every elbow or "T" to the actual length. Use the charts below to determine the pipe diameter necessary to accommodate the BTU demand of the unit. If there are more gas drawing appliances on the line, size according to the maximum amount of BTU demand.

FOR NATURAL GAS

Maximum Capacity of pipe in Cubic Feet of Gas per Hour for Gas Pressure of 0.5 Psig or less and a Pressure drop of 0.3 in Water Column.
(Based on a 0.60 Specific Gravity Gas) Btu numbers given in thousands.

Follow boxed numbers for piping just one 425 HN (example: 3/4" B.I. Natural Gas pipe for 30 ft. will handle 152,000 btu's). For multiple appliances combine the total btu input load and then refer to applicable chart below.

Nominal Iron Pipe Size, inches	Internal Diameter inches	Length of Black Iron Pipe, Feet													
		10	20	30	40	50	60	70	80	90	100	125	150	175	200
1/4	0.364	32	22	18	15	14	12	11	11	10	9	8	8	7	6
3/8	0.493	72	49	40	34	30	27	25	23	22	21	18	17	15	14
1/2	0.622	132	92	73	63	56	50	46	43	40	38	34	31	28	26
3/4	0.824	278	190	152	130	115	105	96	90	84	79	72	64	59	55
1	1.049	520	350	285	245	215	195	180	170	160	150	130	120	110	100
1 1/4	1.380	1050	730	590	500	440	400	370	350	320	305	275	250	225	210
1 1/2	1.610	1600	1100	890	760	670	610	560	530	490	460	410	380	350	320
2	2.067	3050	2100	1650	1450	1270	1150	1050	990	930	870	780	710	650	610
2 1/2	2.469	4800	3300	2700	2300	2000	1850	1700	1600	1500	1400	1250	1130	1050	980
3	3.068	8500	5900	4700	4100	3600	3250	3000	2800	2600	2500	2200	2000	1850	1700
4	4.026	17,500	12,000	9,700	8,300	7,400	6,80	6,200	5,800	5,400	5,100	4,500	4,100	3,800	3500

FOR LP GAS

Maximum Capacity of Pipe in Thousands of BTU per Hour of Undiluted Petroleum Gases (at 11 inches Water Column Inlet Pressure) (Based on a Pressure Drop of 0.5 Inch Water Column).

Nominal Iron Pipe Size, Inches	Black Iron Pipe Length of Pipe, Feet											
	10	20	30	40	50	60	70	80	90	100	125	150
1/2	275	189	152	129	114	103	96	89	83	78	69	63
3/4	567	693	315	267	237	217	196	185	173	162	146	132
1	107	732	590	504	448	409	378	346	322	307	275	252
1 1/4	220	149	121	103	913	834	771	724	677	630	567	511
1 1/2	330	229	185	155	141	127	118	108	102	976	866	787
2	622	433	346	299	264	239	220	204	192	1811	1606	1496

Maximum Capacity of Semi-Rigid Tubing in Thousands of BTU per Hour of Undiluted Liquified Petroleum Gases (at 11 inches Water Column Inlet Pressure)

(Based on a Pressure Drop of 0.5 Inch Water Column)

Outside Diameter, Inch	Copper Length of Tubing, Feet									
	10	20	30	40	50	60	70	80	90	100
3/8	39	26	21	19	_	_	_	_	_	_
1/2	92	62	50	41	37	35	31	29	27	26
5/8	199	131	107	90	79	72	67	62	59	55
3/4	329	216	181	145	131	121	112	104	95	90
7/8	501	346	277	233	198	187	164	155	146	138

* Source National Fuel Gas Code NFPA 54, ANSI Z223.1.

WATER CONNECTIONS

Install the heater centrally in the building if possible and make hot water piping runs as short as possible When facing the heater, the cold water inlet will be on the right and the hot water outlet on the left.
Although water piping throughout the building may be other than copper, copper or galvanized piping should be used when connecting to the heaters ½" male NPT flex connectors (follow local codes if more stringent). Plastics or other PEX type plumbing line materials are not suitable for connecting directly to the water heater. Keep water inlet pipe to no less than ½" (19.05mm) diameter to allow the full flow capacity. If the cold and hot connections to the heater are reversed, the heater will not function.
The 425 HN is provided with one flexible type connector that must be connected to the cold inlet fitting of the water valve as shown in Fig. 6. The union end of the flexible connector should be attached to the rear inlet port of the water valve with the supplied washer gasket. No pipe dope or thread tape is to be used at this joint. The ½" flexible hot water outlet line is supplied attached to the heater.
Be certain there are no loose particles or dirt in the piping. Blow out or flush the lines before connecting to the water heater. Full port valves should be installed on both the cold water supply and hot water outlet lines to facilitate servicing the heater (see Fig. 7). For installation on a private well system with the use of a pressure tank, the lowest pressure range setting recommended is 30-50 psi (2.07-3.45 bar).

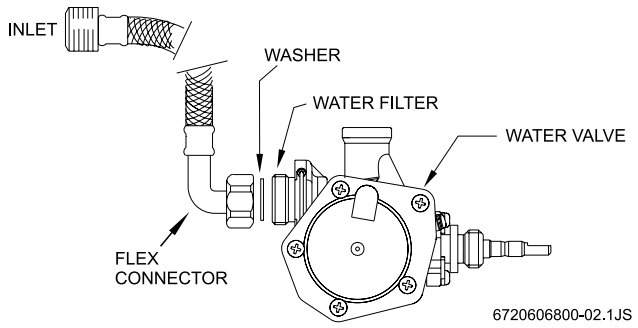


Fig. 6 - Water valve - top view

Connecting the pressure relief valve (PRV)

A listed pressure relief valve supplied with the heater must be installed at the time of installation. No valve is to be placed between the PRV and the heater. No reducing coupling or other restriction may be installed in the discharge line.
The discharge line must be installed such that it allows complete drainage of both the PRV and the line.
The location of the PRV must be readily accessible for servicing or replacement, and be mounted as close to the water heater as possible. See Fig 7. To install the PRV, a suitable fitting connected to an extension on a "T" fitting can be sweated to the hot water line.
Support all piping.

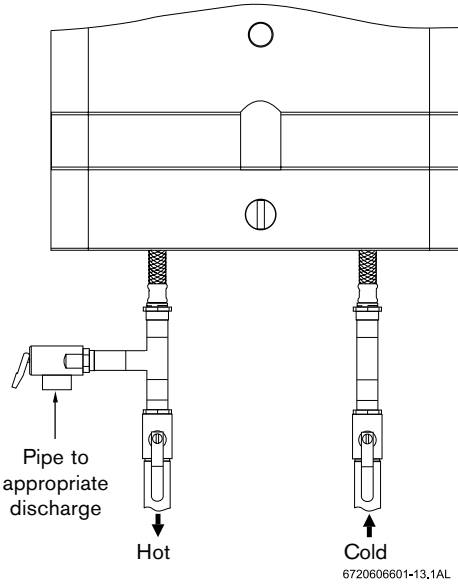


Fig. 7 - Pressure Relief Valve

OPERATING INSTRUCTIONS
Before proceeding with the operation of the heater make sure that the system is filled with water.
Open the cold water inlet supply to the heater fully.
Open a hot water faucet to permit the water to fill the heater and the piping and to eliminate the air trapped in the system
Close the hot water faucet after the water flows freely and all the air has escaped from the system. The water heater is now ready to operate.

FOR YOUR SAFETY READ BEFORE OPERATING YOUR HOT WATER HEATER

Warning: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance is equipped with electronic ignition for lighting the pilot and main burners. When turning the heater on, follow these instructions exactly.
B. Before operating the unit, set the On/Off switch to the On (▁▬▁) position. The On/Off switch is located behind the flip-down coverplate on the front panel strip. Smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to push in the on/off control button. Never use tools. Follow these instructions exactly. If control button is jammed, close the gas supply and call a qualified service technician. Attempted forceful repair may result in a fire or explosion.
D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

LIGHTING AND OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. The gas valve must be shut off by putting the ON/OFF switch to position " ▬ ". Wait five (5) minutes to clear out any gas. If you smell gas, STOP! Follow "B" in the safety information above. If you do not smell gas, go to the next step.
3. This water heater is equipped with a safety pilot burner and an automatic ignition control system.
4. Set the ON/OFF switch (flip down cover plate on front panel strip) to the " ▬ " position. In this position, the water heater is ready to use.
5. If the red LED indicator light is flashing, this is a warning that the water pressure is not enough to ignite the main burner.
6. Turn the hot water faucet on to the minimum flow rate required to activate the heater. The automatic ignition system first ignites the safety pilot burner which then ignites the main burner in about 4 seconds.
7. The green LED indicator is on when the main burner is on.
8. The pilot flame will extinguish 10-30 seconds after the burners come on. The burners will remain on until the hot water tap is turned off.

NOTE: On a first time initial installation, existence of air in the gas supply line and in the water line may cause some ignition delay. In that case, repeatedly open and close the hot water tap in order to restart the ignition process until all the air has been purged.

TO TURN OFF GAS TO APPLIANCE

Turn off the manual lever on the gas supply line to the heater and set the ON/OFF switch to the OFF (▬) position. See Fig 9.

SETTING THE WATER TEMPERATURE

The 425 HN LP and 425 HN NG water heaters have a gas control that modulates burner input in response to flow. Its purpose is to ensure that the hot water temperature will remain steady, although the water flow demand might vary (down to 1/2 gal/minute). To adjust the temperature on your 425 HN, turn on a hot water faucet to its maximum flow. At the water heater, turn the large knob located beneath the main gas control on the front of the heater all the way to the right (clockwise). See Fig 8. This will produce a temperature rise of approximately 90°F at flow rates between 0.5 and 2.0 gallons per minute. Given that average incoming water temperatures are 50°F, this heater will produce approximately 140°F water at these flow rates. Turning the dial all the way to the left (counterclockwise) will produce a temperature rise of approximately 45°F for flow rates between 1.1 and 3.7 gallons per minute. It is safest to select a comfortable temperature and not have to mix in cold water.

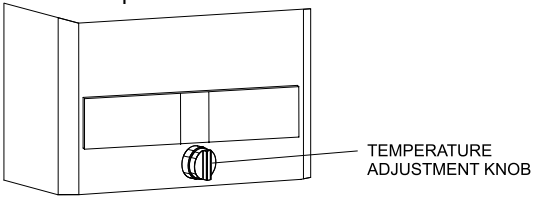


Fig. 8 - Temperature Adjustment Knob

The position you select on the temperature adjustment knob will depend on the temperature of the incoming water (50°F is average in the U.S.). In warm weather regions where the incoming cold water is generally warmer, or during the hot weather months in some other areas a midway setting on the temperature adjustment knob would produce a temperature rise of about 70°F, giving an output of approximately 120°F. At this setting, if it is still necessary, one could mix a small amount of cold water in a shower and have a comfortable shower at about 3 gallons/minute. During the colder months, or in cold climate areas, it might be necessary to set the control to the maximum position, all the way clockwise to the right.

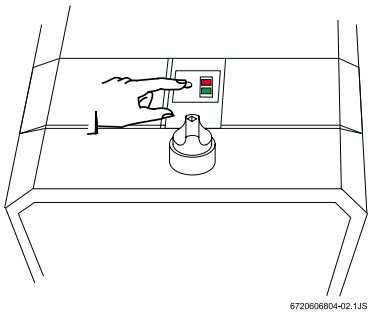
If you supply the 425 HN, with preheated water (i.e.) in a solar installation the unit could overheat. It will then shut off on safety when the outlet temperature reaches 194°F. For this type of application, purchase a solar model 125B LPS or 125B NGS.

If the inlet water temperature to the water heater is very warm the heater can produce temperatures that may be found to be too hot. A temperature balance shower valve can automatically mix in cold water to reduce such hot water temperature, in the event of any temperature instability with the use of a temperature balance shower valve, refer to shower valve manufactures instructions for internal adjustment setting. Adjustments should be made to the hottest setting in the shower valve. Additionally the temperature control of the heater can be adjusted to produce a more comfortable hot water temperature.

To start and to shut down the appliance press the button "⏻".
The switch is located behind the flip down cover plate on the front panel strip.

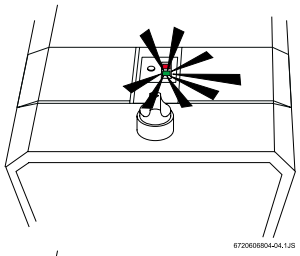
▬ - on

▬ - off

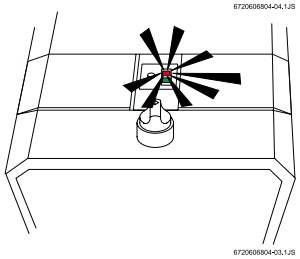


Green light on = main burner on.

Green light off = main burner off.



If the red light is flashing, that means the water flow is not enough to ignite the burner.



Temperature Adjustment Knob

Decrease temperature and increase flow

Increases temperature and decreases flow

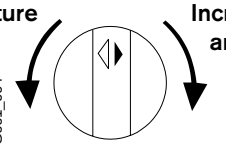


Fig. 9 - Principles of Operation

MAINTENANCE AND SERVICE

REVIEW MAINTENANCE TABLE ON THE BACK OF THIS MANUAL.

Approximately once a year, the 425 HN should be checked and cleaned. To remove the front cover, first remove the incandescent particle tray, then pull off the temperature adjustment knob and unscrew and remove the plastic collar. Pull main cover out toward you and lift up and out. THE FOLLOWING OPERATIONS SHOULD BE PERFORMED BY A QUALIFIED SERVICE PERSON:

Vent System: Should be checked annually. Clean and repair as needed.

Water Valve (Part # 8707002649): The water valve on this heater should be serviced periodically. Lubricate component 36 on page 18 with a small amount of silicon, faucet or lithium grease every two years to keep its o rings fresh and pushrod sliding smoothly. Every 3-5 years replace component 36 on page 18. The frequency will depend on the mineral content of the water and conditions of use or whenever signs of corrosion appear at the gas and water valve joint. Periodically check that the water inlet filter (#27 on page 18) is clean as well. NOTE: If water valve is removed, be sure to also inspect the o ring seal on the end of the right hand side water pipe before re-installing. Lubricating the o ring with lithium or faucet and valve grease is recommended.

Pilot Flame: The pilot flame should burn with a clean, sharp, blue flame and should resemble the diagram in Fig. 10. If the flame is soft and yellow, the pilot burner orifice may need to be cleaned or replaced. The pilot flame should be approximately 2 inches long, extending past the flame sensor. If the flame is too small, it will not reach the flame sensor and the burners will not come on.

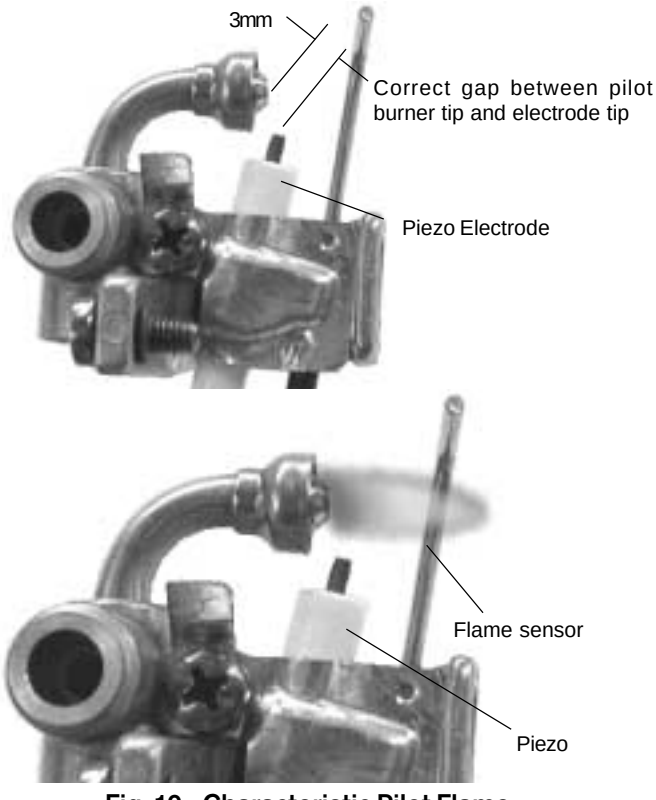


Fig. 10 - Characteristic Pilot Flame
(Pilot assembly shown without pilot hood)

To clean the pilot burner and/ or the pilot orifice : Turn off the gas to the unit. Set the On/Off switch to Off (position ▬). Remove the cover of the heater. To do so, pull off the temperature adjustment knob and unscrew and remove the plastic collar. Pull main cover out toward you and lift up and out. The pilot orifice should be cleaned or replaced. **Do not enlarge the orifice.**

Do not use any wire or sharp object to clean orifices. Natural gas orifices are large enough that you can usually clean them by blowing through them. LP orifices, on the other hand, are too small to clean and should be replaced.

To access the pilot orifice, remove 2 screws holding pilot assembly in place. Then loosen compression fittings to expose pilot orifice.

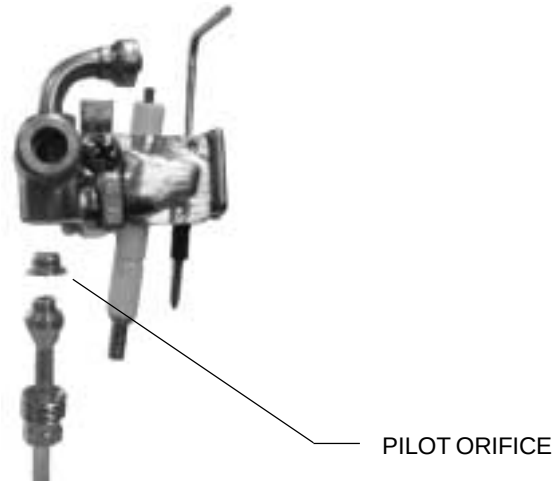


Fig. 11 - Pilot burner with pilot orifice
(Pilot assembly shown without pilot hood)

Main Burner Flames: The main burner flames should be blue, with a more intense blue cone in the center core. Yellow flames could be a sign of wrong size gas orifices or dirty burners, or a blockage on the heat exchangers fins. If some burners have yellow flames while others have good flames, it is likely that dust, lint or spider webs have partially clogged the burner venturis. To clean the burners, contact a gas service person.

Mineral Scale Build-up: The 425 HN heater, when operated at lower temperature settings, does not accumulate mineral build-up. If however, the heater is used at the higher temperature settings and the water has a high mineral content, periodic descaling may be necessary. The heating coils should be flushed with a descaling solution. **The descaling is done only to the heat exchanger.** The chemicals will damage the hydro-generator and other parts. Consult your service person.

TROUBLE SHOOTING

Introduction

The 425 HN burners are activated by a water flow valve. Numerous water related problems can cause this water valve to malfunction such as: Insufficient water flow volume to activate the burners at its minimum flow requirement; Dirt in the water flow valve causing it to malfunction; Sediment build-up in faucet aerators, or shower heads; Uneven pressures between cold and hot. (with single lever faucets) Plumbing cross overs. These water flow related problems can cause the heater to deliver less than its full output, or to fail to ignite or to shut down completely.

Problems are stated in upper case, bold face. Most common causes for the problems follow in order of likelihood. The suggested solutions require that the cover be taken off. To do this, remove incandescent particle tray, pull off the temperature adjustment knob and unscrew and remove the plastic collar. Pull main cover out toward you and lift up and out.

NO SPARK AT THE PILOT

1. On/Off switch is not "On" (Position _▬_).
The On/Off switch is located behind the flipdown cover plate on the front panel strip. See fig. 9.

2. Cross over in water lines
To confirm there is no cross-over in the plumbing, shut off the cold water supply to the 425 HN and open all hot water faucets. There should not be any water flowing at any faucets. Water running is a sign of a plumbing cross-over. Consult your service person.

3. Water flow is not sufficient to activate heater.
Water flow rate at faucet is below minimum flow needed to activate heater. When temperature adjustment knob is turned all the way clockwise, the model 425 HN requires 1/2 gallon per minute flow to activate the heater. As a reference, this is a flow which would fill a quart jar in 30 seconds. If the temperature adjustment knob is turned fully counterclockwise, a flow rate of 1.1 gallons/minute is required to activate the heater.
The red LED light (located behind the coverplate on the front panel) flashes when the water flow is not enough.

4. Water inlet filter is clogged
Water flow is restricted, preventing needed flow to activate heater. Clean water inlet filter screen.

5. Cold incoming water connection made to wrong side of heater
Make sure cold water inlet connection is on the right side of heater when you are facing heater.

6. Water valve parts may be dirty or components damaged
First check that venturi is free of dirt particles. Water valve and component parts must be totally free of dirt. In hard water areas, mineral deposits can eventually (3-5 years in hard water areas) corrode the water valve parts to a point where they will need replacing. *Any sign of moisture or corrosion at the joint of the water valve and the gas valve is a sign that the water valve components need to be serviced immediately.*

7. Poor circuit connections at the ECO (overheat sensor) or the flue gas safety device
Ignition sparker will not operate if the electrical circuit is interrupted. Check that the connections to the ECO and Flue Gas Safety Device are secure and tighten if necessary. *If the 425 HN is Powervented, check spill switch reset*

SPARK APPEARS AT PILOT WHEN HOT WATER TAP TURNED ON, BUT PILOT AND BURNERS WILL NOT IGNITE

1. Air in the Gas Line
Normally this is a problem at time of initial installation, after the pipes have been worked on, or after a gas supply line has been allowed to empty. Bleed the air trapped in the gas line by turning the hot water faucet on and off until the air has been cleared from the line.

2. No gas to the 425 HN
A. Gas cock on gas line may not be open
B. Gas regulator may be shut or damaged. Replace or unlock the regulator. **Note:** The regulator furnished with the heater is exclusively designed for low gas pressure. Excessive pressure will lock it up. Locking usually happens when using propane gas if the gas pressure between the gas tank and the water heater's gas regulator has not been reduced. See Page 2 for recommended correct gas pressure. To unlock a regulator, consult your service person.

3. Pilot orifice or gas valve is dirty
Clogging of the pilot burner can be caused by dust in the air or dirt in the gas. The pilot orifice or gas filter may need to be cleaned or replaced.

4. Pilot electrovalve switch may need to be replaced (See Fig 13).
Measure milivoltage at pilot electrovalve (see Fig. 13).

5. Electronic Control Box may need to be replaced (See Fig 13).
Check wire connections and test operation of electronic control box (see Fig. 13).

PILOT LIGHTS BUT BURNERS WILL NOT COME ON

1. Confirm water valve assembly is working properly.
See Water Valve under **MAINTENANCE AND SERVICE**.

2. Confirm the flame sensor is in its proper position and clean, lightly wipe clean if dirty. See Fig. 10

3. Confirm the burner electrovalve switch is functioning properly.
Measure milivoltage at burner electrovalve (see Fig. 13).

4. The Electronic Control Box (Fig. 13) may need to be replaced.
Check wire connections and test operation of electronic control box (see Fig. 13).

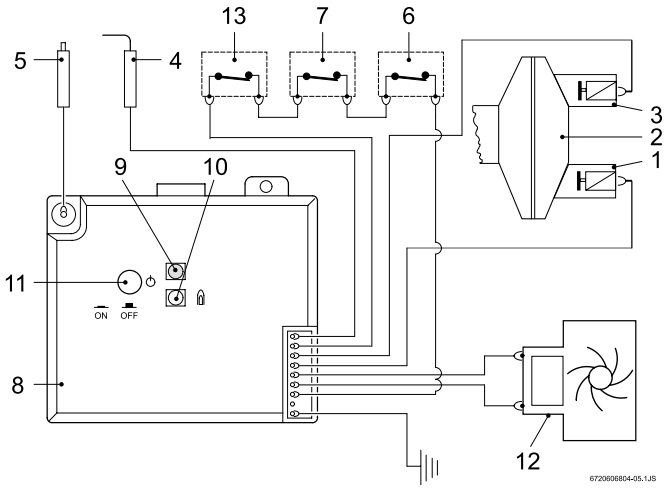


Fig. 13 - Electrical wiring diagram

1	burner electrovalve	8	electronic control box
2	gas control valve	9	LED failure indicator
3	pilot electrovalve	10	LED indicator main burner operation
4	flame sensor		
5	pilot electrode	11	on/off switch
6	overheat sensor	12	hydro-generator
7	temperature limiter	13	flue gas safety device

MAIN BURNERS GO OUT DURING HOT WATER USE

1. Flow rate diminished below activation rate
Increase hot water flow rate.

2. Unbalanced pressure in the water lines
The added restriction caused by the 425 HN in the hot water system can result in uneven pressures between the cold and the hot. In such cases when mixing cold water at the tap, the lower hot water pressure may be overpowered by a much higher cold water pressure, which may cause the 425 HN burners to shut down. Make sure faucet aerators and showerheads are free of minerals and dirt. Do not add any flow restrictor to the shower head.

3. Minimum inlet pressure on well is inadequate
Check the inlet water pressure. On a private well, raise the minimum pressure setting to 30 psi. Confirm that the pressure tank is not water logged.

4. ECO (overheat sensor) tripped due to overheating
re-ignite the appliance 10 minutes later. If it happens again, contact your service person.

5. Flue gas safety device tripped
Ventilate the room and operate the appliance 10 minutes later. Provide more combustion air to the room and/or inspect and correct venting system. Afterwards, if it happens again, contact your service person.

WATER IS TOO HOT

1. Temperature Selection too high
Turn the temperature adjustment knob counter-clockwise (to the left) to lower the maximum water temperature.
Note: This will increase the activation flow rate.

2. Inlet water temperature is too hot (as with solar preheated water or high ground water temperatures)
Decrease gas pressure. **Note:** Only the model 125B LPS or 125B NGS should be used if the inlet water is preheated.

3. Ground water temperature is very warm
Reduce inlet gas supply to heater when inlet water temperature is very warm (60-70 F). See also HOT WATER TEMPERATURE FLUCTUATES / UNIT DEACTIVATED.

WATER IS NOT HOT ENOUGH

1. Temperature selection too low.
Change the setting. Turn the temperature adjustment knob clockwise (to the right).
Note: This will decrease the activation flow rate.

2. Btu input is too low due to insufficient gas pressure
It is extremely important for a tankless instantaneous water heater to have the right size gas line to obtain the correct gas pressure
See specifications on page 2. Unlike storage tank water heaters, the burners of a tankless water heater must be very powerful to heat water instantaneously since they do this only at the time hot water is actually being used. It is therefore imperative that the gas pressure requirement be met exactly. Insufficient gas pressure will directly affect the water temperature at the time of usage. See page 2 for correct gas pressure settings and fig. 5 for locations where gas pressures are taken.

3. Btu input is too low due to insufficient gas supply
Make sure your main gas line is fully opened. If using LP gas, be sure that the size of the propane tank is adequate to supply the required gas pressure.

4. Cold water is mixing with the hot water between the 425 HN and the outlet
Compare water temperature at outlet of the 425 HN (hold the 425 HN outlet pipe with your hand) and at the tap. If these two are very different, check for mixing valve or plumbing crossover (see “NO SPARK AT THE PILOT” paragraph #4).

5. Parts in water valve are dirty or damaged, which will prevent the gas valve from being fully opened.
Water valve maintenance needs to be performed, see #6 under NO SPARK AT THE PILOT

HOT WATER TEMPERATURE FLUCTUATES / UNIT DEACTIVATED

1. Unbalanced pressure in waterlines

The added restriction caused by the 425 HN in the hot water system can result in uneven pressures between the cold and the hot. In such cases when mixing cold water at the tap, the lower hot water pressure may be overpowered by a much higher cold water pressure, which may cause the 425 HN burners to shut down. Make sure faucet aerators or shower heads are free of minerals. ***Do not add any flow restrictor to the shower head.***

2. Temperature balance valves

If the inlet water temperature to the water heater is very warm the heater can produce temperatures that may be found to be too hot. A temperature balance shower valve can automatically mix in cold water to reduce such hot water temperature, in the event of any temperature instability with the use of a temperature balance shower valve, refer to shower valve manufactures instructions for internal adjustment setting. Adjustments should be made to the hottest setting in the shower valve. Additionally the temperature control of the heater can be adjusted to produce a more comfortable hot water temperature. See **SETTING THE WATER TEMPERATURE** section.

3. Cold water is mixing with the hot water between the 425 HN and the outlet

See #4 under “NO SPARK AT THE PILOT”.

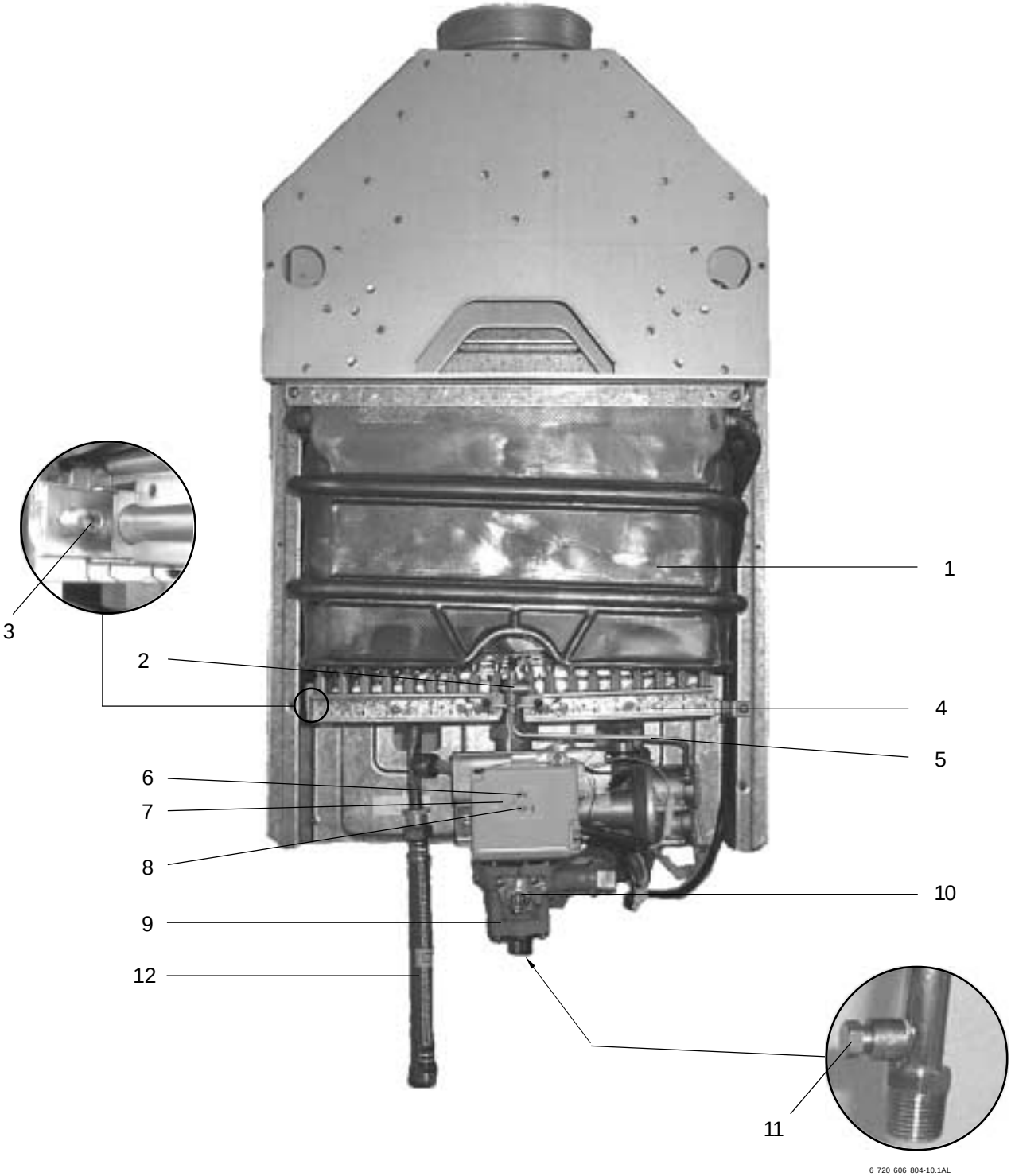
4. Inlet water pressure is erratic due to inadequate supply water pressure or saturated pressure tank on well system

Check the inlet water pressure. For installation on a private well system with the use of a pressure tank, the lowest pressure range setting recommended is 30-50 psi (2.07 - 3.45 bar). Confirm that the pressure tank is not water logged.

5. Gas pressure is too low

See page 2 for correct specifications.

Fig. 14 - Diagram of 425 HN



1. Heat exchanger
2. Pilot assembly
3. Burner manifold gas pressure test nipple
4. Main gas burner
5. Pilot gas tubing
6. LED failure indicator
7. on/off switch
8. LED operation indicator
9. Water valve
10. Temperature adjustment selector
11. Gas inlet gas pressure test nipple
12. Hose

Fig. 15 - INTERIOR COMPONENTS DIAGRAM AND PARTS LIST

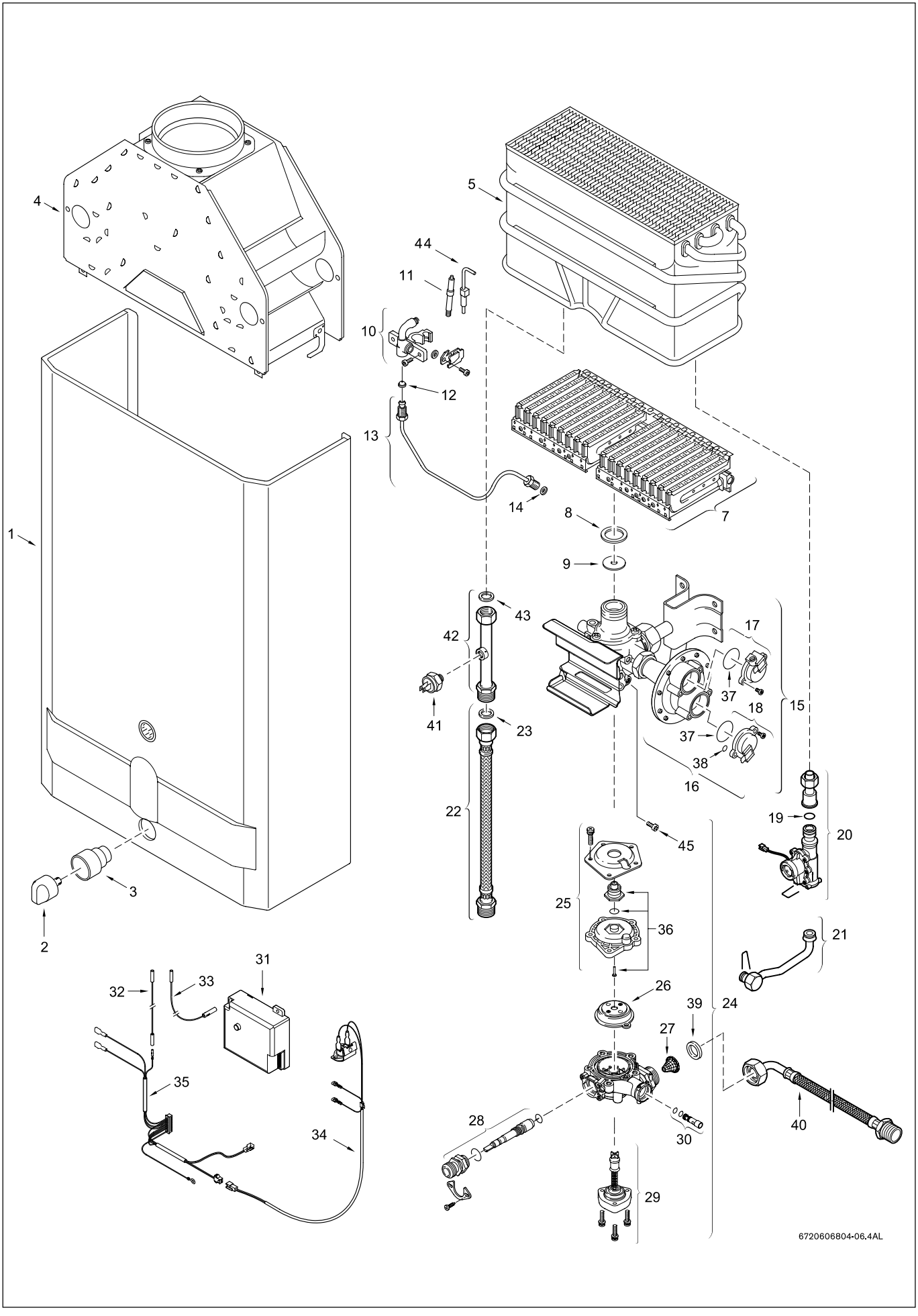
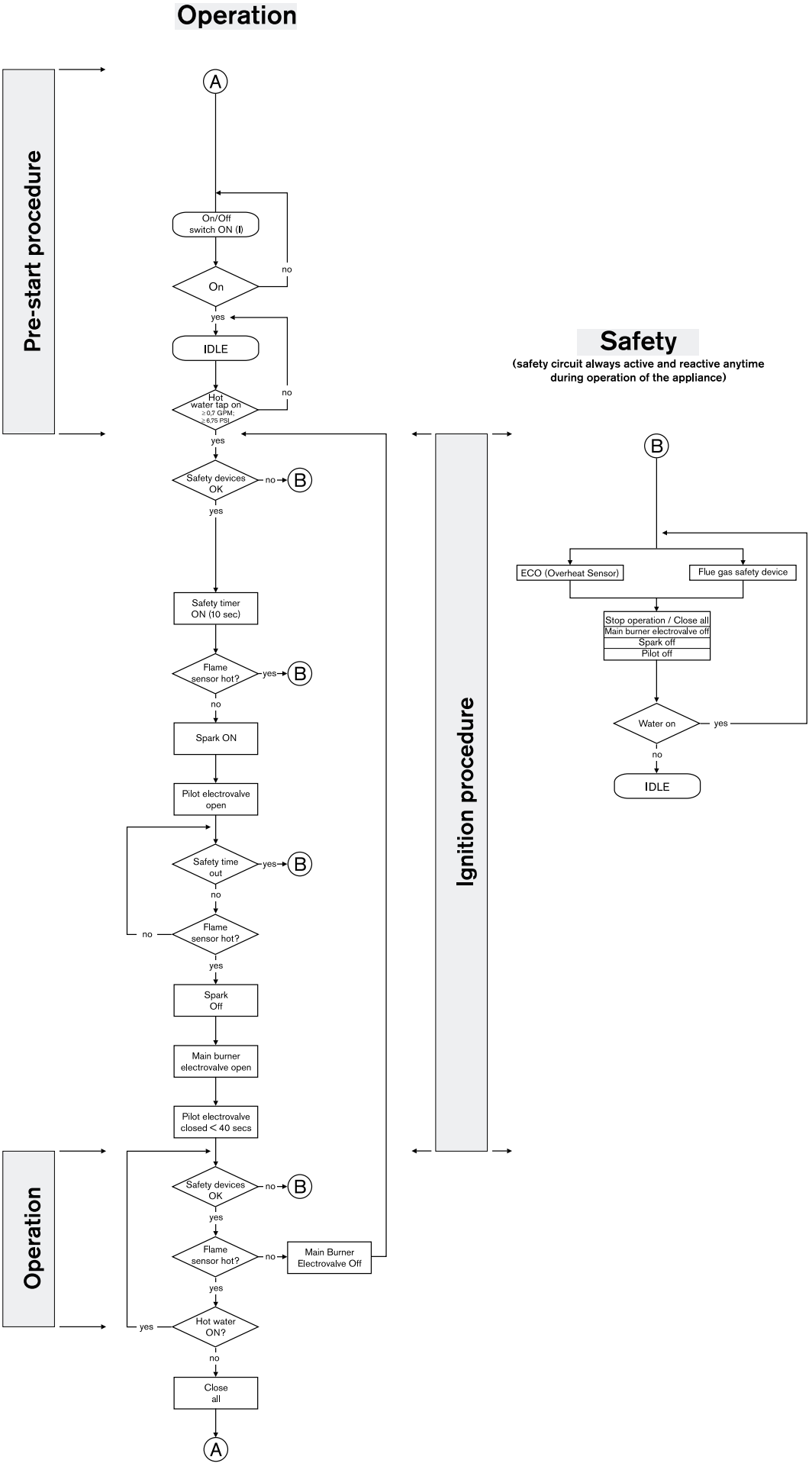


Fig. 15

INTERIOR COMPONENTS DIAGRAM AND PARTS LIST 425 HN

1	Cover	8 705 421 752	
2	Temperature adjustment knob	8 702 000 111	
3	Temperature adjustment collar	8 700 403 008	
4	Draft diverter	8 705 505 354	
5	Heat exchanger	8 705 406 235	
7	Main burner	8 708 120 298	NG
7	Main burner	8 708 120 296	LP
8	Burner assembly washer	8 710 103 060	
9	Throttle disc	8 700 100 174	LP
10	Pilot burner	8 708 105 491	LP
10	Pilot burner	8 718 105 051	NG
11	Pilot electrode	8 708 107 006	
12	Pilot orifice	8 708 200 069	NG
12	Pilot orifice	8 708 200 312	LP
13	Pilot tube	8 700 707 370	
14	Washer pilot tube	8 700 103 173	
15	Gas valve	8 707 011 917	NG
15	Gas valve	8 707 011 945	LP
16	Diaphragm switch	8 708 504 021	NG
16	Diaphragm switch	8 708 504 049	LP
17	Pilot electrovalve	8 708 501 249	
18	Burner electrovalve	8 708 501 250	
19	O-ring	8 700 205 023	
20	Hydro-generator	8 707 406 043	
21	Cold water pipe	8 700 705 947	
22	Outlet flex hose	8 700 703 139	
23	Washer	8 700 103 658	
24	Water valve	8 707 002 649	
25	Water valve cover	8 705 500 101	
26	Diaphragm	8 700 503 053	
27	Water inlet filter	8 700 507 001	
28	Water valve selector screw	8 708 500 289	
29	Volumetric water governor	8 705 705 009	
30	Venturi	8 708 205 279	
31	Electronic control box	8 707 207 085	
32	Flame sensor cable	8 704 404 040	
33	Electrode cable	8 704 404 039	
34	Flue Gas Sensor	8 707 206 345	
35	Set of cables	8 704 404 038	
36	Pushrod	8 700 306 114	
37	O-ring	8 700 205 120	
38	O-ring	8 700 205 119	
39	Water connection gasket	8 710 103 043	
40	Water elbow fitting	8 700 703 114	
41	Overheat sensor (ECO)	8 707 206 040	
42	Connecting pipe hot	8 700 715 178	
43	Washer	8 710 103 045	
44	Flame sensor	8 708 107 007	
45	Water valve set screw	8 703 401 051	

Fig. 16 - Flow chart of 425 HN



Fifteen Year Limited Warranty

General
BOSCH PRO water heaters are warranted by the Manufacturer (BOSCH) through Controlled Energy Corp. Controlled Energy Corp. (CEC) will furnish a replacement heat exchanger and will furnish a replacement of any other part which fails in normal use and service within the applicable periods specified below, in accordance with the terms of this warranty. The CEC replacement will be warranted for the unexpired portion of the original warranty. This warranty will be valid only for water heaters in possession of the original purchaser as recorded on the warranty card.

The Heat Exchanger
If the heat exchanger fails within fifteen (15) years after the original installation and operation, CEC will furnish a replacement heat exchanger. However, if the water heater is installed in other than a single family dwelling this heat exchanger warranty is limited to two (2) years from date of original installation and operation.

Exceptions
This warranty will not apply:
1. to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with the printed instructions provided;
2. to damage or abuse, accident, neglect or freezing and other acts of nature;
3. to damage resulting from operation with either the flame sensor rod or overheat sensor removed;
4. to failure of the heat exchanger resulting from the operation of the water heater in a corrosive atmosphere or at water temperatures exceeding the maximum rating, or if the water heater is not supplied with potable water;
5. to defects or damage cause by any attachment or modification, including any energy-saving device.

All Other Parts
If any other part fails within three (3) years after original installation and operation, CEC will furnish a replacement part free of charge.

Shipping costs
In addition to supplying the replacement part(s), CEC will provide ground service delivery for these parts. Expedited or upgraded shipping will be charged to the customer.

Service Labor Costs
This warranty does not cover any labor costs associated with service, removal or re-installation of part(s). All such costs must be borne by the Purchaser. Additionally, this warranty does not cover any labor costs associated with service, removal or re-installation of the original water heater or a replaced water heater.
Certain service labor allowances are available to PHCC member contractors, dependent on prior authorization by CEC.

NOTE: the water heater must be free of damaging scale deposits and not subject to gas pressures greater than those shown on the rating plate, which must not be altered, defaced or removed.

How to Make a Claim
Any claim for warranty parts should be made to your local dealer, distributor or to CEC. If CEC, please contact the Technical Support Department:

Controlled Energy Corp.
340 Mad River Park
Waitsfield, VT 05673
Phone: 866-330-2730
www.protankless.com

In most cases, the dealer or distributor will be able to promptly honor your claim and subsequently notify CEC. However, all replacements are made subject to validation by CEC of in-warranty coverage. The damaged or defective item must be made available in exchange for the replacement.

Miscellaneous
No one is authorized to make any other warranties on behalf of CEC. It is expressly understood that the replacement warranty of CEC shall be in lieu of any and all other warranties, express or implied, including warranties of merchantability or fitness for a particular use or purpose, and further that CEC shall not be liable for any loss or damage directly or indirectly arising from the use of the hot water heater, or for any consequential damages arising from such use (including damages from water leakage). CEC's sole liability with respect to any defect shall be for the replacement of the defective part(s). Some states do not allow such limitations and exclusions, so the above may not apply to you.
This warranty gives specific legal rights. You may also have other rights which vary from state to state.

MAINTENANCE TABLE see page 13			
	EVERY YEAR	EVERY 2 YEARS	EVERY 3-5 YEARS
LUBRICATE WATER VALVE		†	
REBUILD WATER VALVE			†
INSPECT WATER FILTER SCREEN	†		
INSPECT PILOT ASSEMBLY	†		
INSPECT VENT ASSEMBLY	†		
INSPECT MAIN BURNER	†		

Replacement Parts available from North American Distributor

CONTROLLED ENERGY CORP.

340 Mad River Park
Waitsfield, Vermont 05673
Phone 866-330-2730
Fax (802) 496-6924
www.protankless.com
techsupport@protankless.com

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